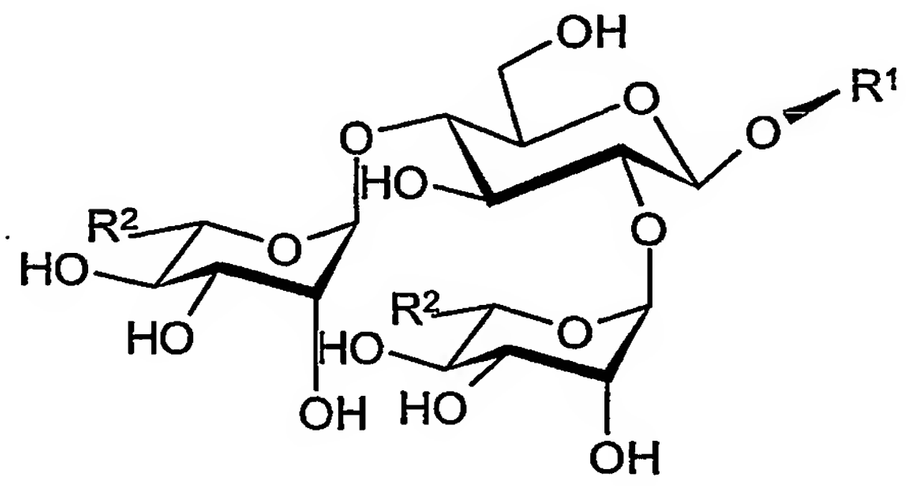
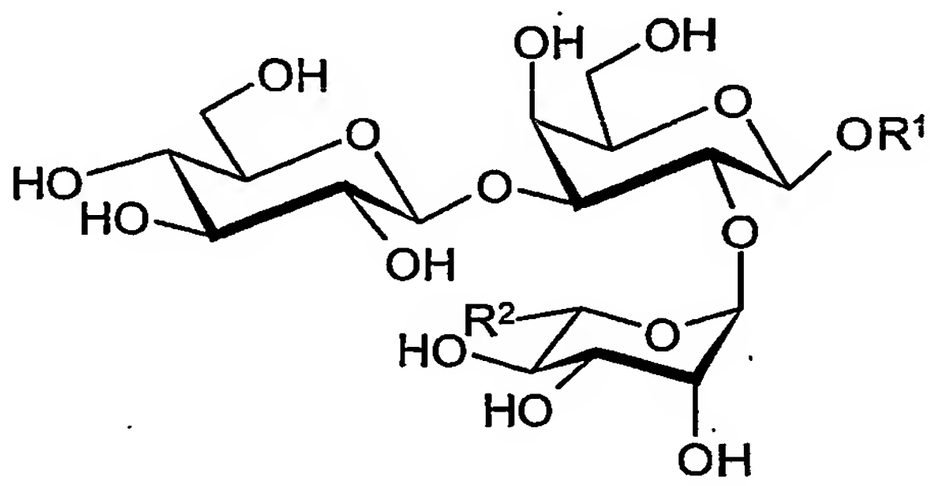
Claims

1. A method for the preparation of a steroid modified chacotriose of general formula (Ia) or a steroid modified solatriose of general formula (Ib):



Formula (Ia)

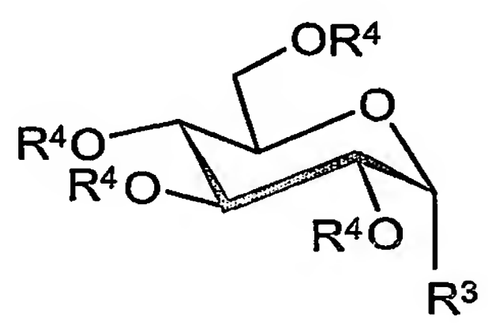


Formula (Ib)

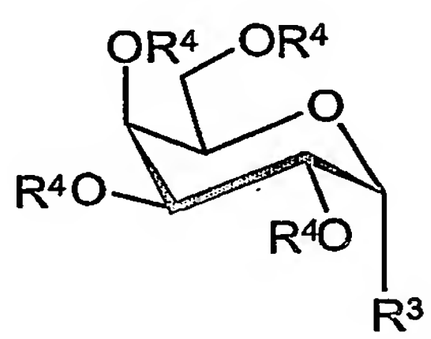
wherein R^1 represents a steroid or a derivative thereof having a hydroxyl group in the 3-position and no further unprotected hydroxyl groups; and each R^2 independently represents a straight or branched C_{1-14} alkyl group, a C_{5-12} aryl or heteroaryl group optionally substituted by one or more halogen atoms or C_{1-4} alkyl groups, or a hydroxyl group,

which method comprises the step of:

reacting a compound of general formula (IIa) or (IIb):



Formula (IIa)



Formula (IIb)

wherein R^3 represents a halogen atom, an ethylsulfide or a phenyl sulfide group; and each R^4 independently represents a benzoyl, substituted benzoyl, whereby the substituents are selected from C_{1-4} alkyl groups, halogen atoms and NO_2, acetyl or pivolyl protecting group;

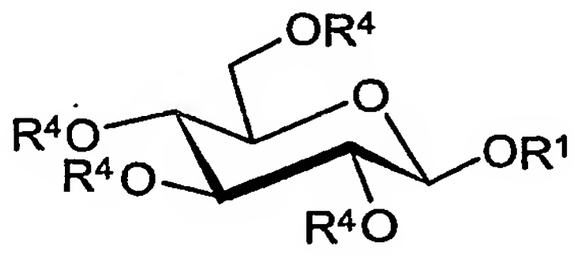
with a compound of general formula (III):

$$HO–R^1$$

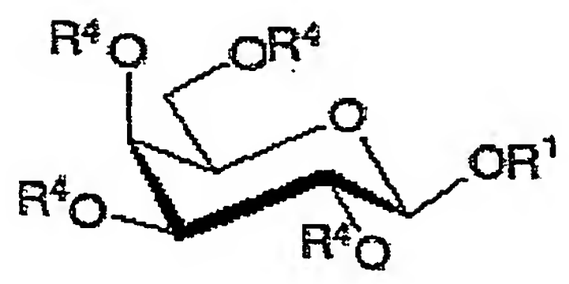
Formula (III)

wherein R^1 is defined as above;

to yield a compound of general formula (IVa) or (IVb):



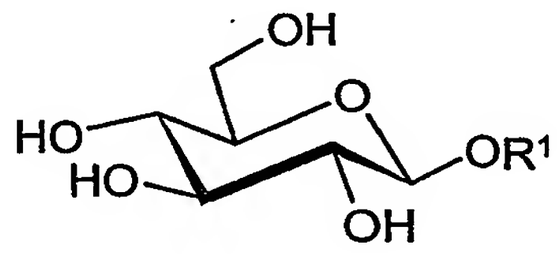
Formula (IVa)



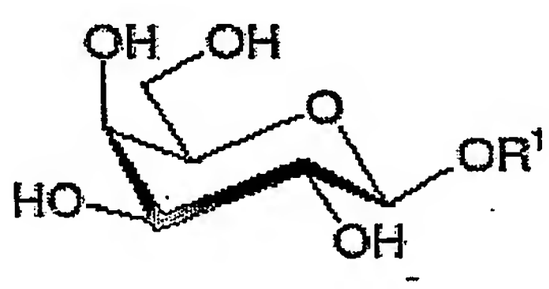
Formula (IVb)

wherein R^1 and R^4 are defined as above.

2. The method according to claim 1, further comprising the step of:
deprotecting the compound of general formula (IVa) or (IVb), respectively, as defined in claim 1 to yield a compound of general formula (Va) or (Vb):



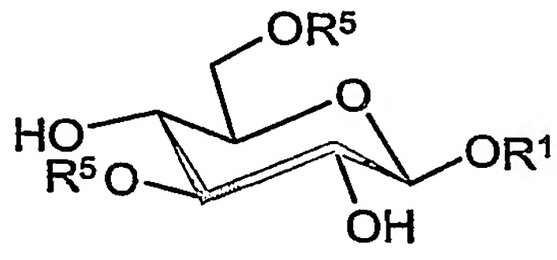
Formula (Va)



Formula (Vb)

wherein R^1 is as defined in claim 1.

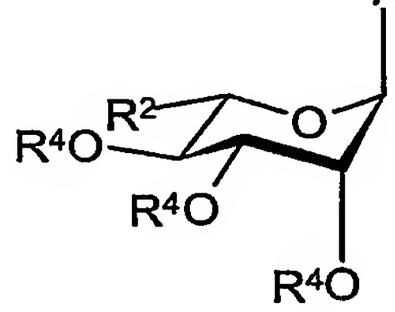
3. The method according to claim 1 or 2 for preparing a steroid modified chacotriose of general formula (Ia), further comprising the step of:
reacting the compound of general formula (Va) as defined in claim 2 with pivolyl chloride in the presence of an amine base to yield a compound of general formula (VIa):



Formula (VIa)

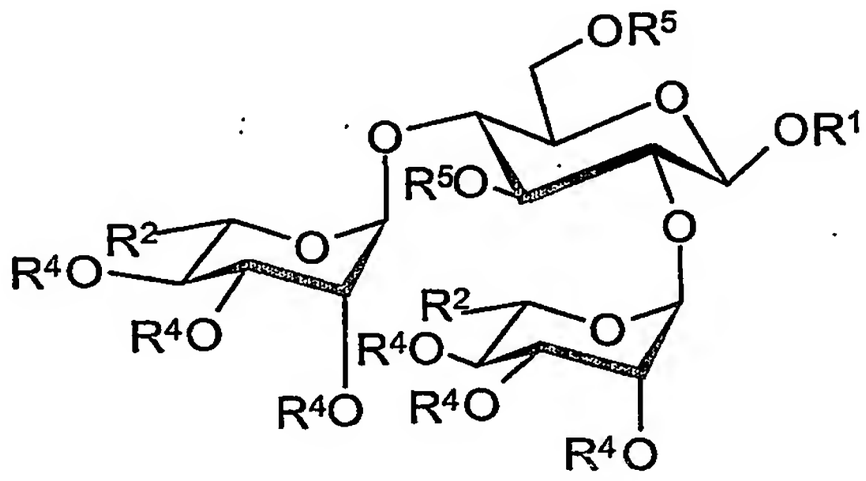
wherein R^1 is as defined in claim 1, and R^5 represents a pivolyl protecting group.

4. The method according to any of claims 1 to 3 for preparing a steroid modified chacotriose of general formula (Ia), further comprising the step of:
reacting the compound of general formula (VIa) as defined in claim 3 with a compound of general formula (VIIa):



Formula (VIIa)

wherein R^2, R^3 and R^4 are as defined in claim 1;
to yield a compound general formula (VIIIa):

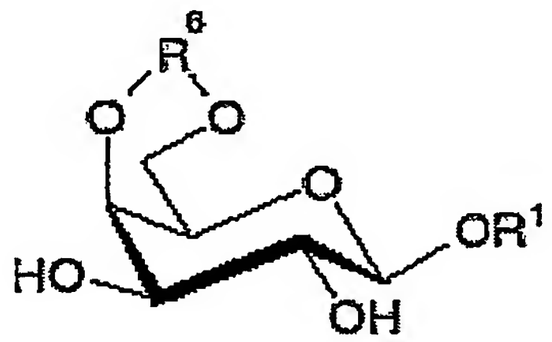


Formula (VIIIa)

wherein R^1, R^2 and R^4 are as defined in claim 1, and R^5 is as defined in claim 3.

5. The method according of any of claims 1 to 4 for preparing a steroid modified chacotriose of general formula (Ia), further comprising the step of:
deprotecting the compound of general formula (VIIIa) as defined in claim 4 to yield the compound of general formula (Ia).

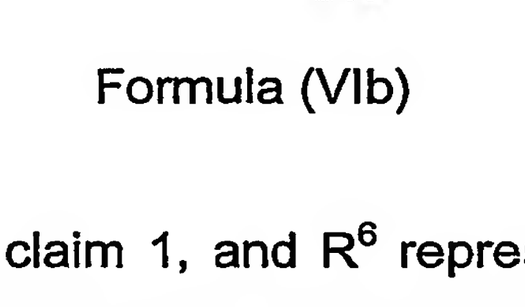
6. The method according to claim 1 or 2 for preparing a steroid modified solatriose of general formula (Ib), further comprising the step of:
selectively protecting the OH groups in 4- and 6-position of the compound of formula (Vb) as defined in claim 2 with a ketal or acetal protecting type protecting group using standard conditions, to yield a compound of general formula (VIb):



Formula (VIb)

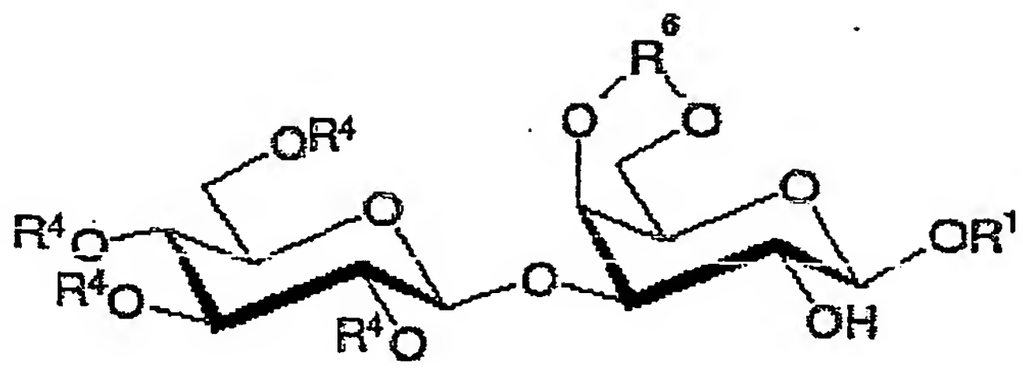
wherein R^1 is as defined in claim 1, and R^6 represents a ketal or acetal type protecting group selected from the group consisting of benzylidene, 4-nitrobenzylidene, 4-methoxybenzylidene and isopropylidene.

7. The method according to any of claims 1, 2 or 6 for preparing a steroid modified solatriose of general formula (Ib), further comprising the step of:
reacting a compound of formula (VIb) as defined in claim 6 with a compound of general formula (VIIb):



Formula (VIIb)

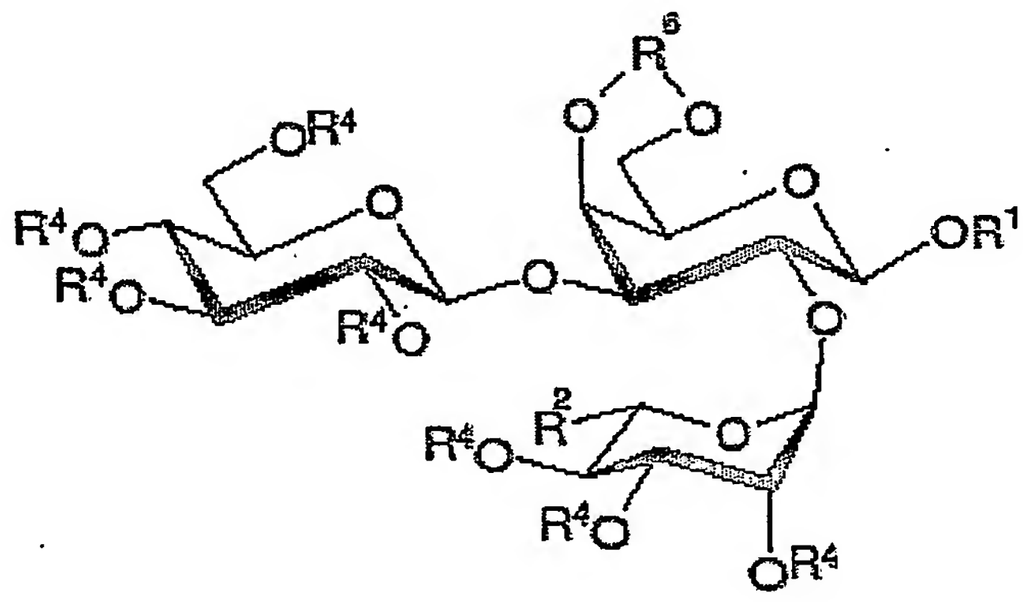
wherein R^3 and R^4 are as defined in claim 1,
to yield a compound general formula (VIIIb):



Formula (VIIIb)

wherein R^1 and R^4 are as defined in claim 1, and R^6 is as defined in claim 6.

8. The method according to any of claims 1, 2, 6 or 7 for preparing a steroid modified solatriose of general formula (Ib), further comprising the step of:
reacting a compound of formula (VIIIb) as defined in claim 7 with a compound of formula (VIIa) as defined in claim 4 to yield a compound of formula (IXb):



Formula (IXb)

wherein R^1, R^2 and R^4 are as defined in claim 1, and R^6 is as defined in claim 6.

9. The method according to any of claims 1, 2, 6, 7 or 8 for preparing a steroid modified solatriose of general formula (Ib), further comprising the step of:
deprotecting the compounnd of formula (IXb) as defined in claim 8 to yield the compound of formula (Ib).

10. The method according to any of the preceding claims, wherein R^1 represents a tomatidin-3-yl, demissidin-3-yl, solanidin-3-yl and solasodin-3-yl group.

11. The method according to any of the preceding claims, wherein R^2 represents a methyl group.

12. The method according to any of the preceding claims, wherein R^3 in the compounds of formulae (IIa), (IIb), (VIIa) and/or (VIIb) represents a bromine atom.

13. The method according to any of claims 1, 4, 7 or 8, wherein the reaction is carried out in the presence of a promoter.

14. The method according to claim 13, wherein the promoter is selected from the group consisting of silver triflate, boron trifluoride diethyl etherate, trimethylsilyl triflate bromide, N-iodosuccinimide and dimethyl thiomethyl sulfonium triflate.

15. The method according to claim 14, wherein the promoter is silver triflate.

16. The method according to any of claims 1, 4, 7 or 8, wherein the reaction is carried out under anhydrous conditions in the presence of 4Å mol sieves.

17. The method according to claim 2 or 5, wherein deprotection is carried out in dichloromethane or tetrahydrofuran in the presence of a C_{1-4} alcohol and an alkali metal alkoxide having 1 to 4 carbon atoms.

18. The method according to claim 17, wherein deprotection is carried out in dichloromethane in the presence of methanol and sodium methoxide.

19. The method according to claim 2 or 5, wherein deprotection is carried out in dichloromethane or tetrahydrofuran in the presence of water, an alkali metal hydroxide and a C_{1-4} alcohol.

20. The method according to claim 19, wherein deprotection is carried out in tetrahydrofuran, and wherein the alkali metal hydroxide is sodium hydroxide and the alcohol is methanol.

21. The method according to claim 1 for preparing a steroid modified solatriose of general formula (Ib), wherein R^4 represents a benzoyl or p-toluolyl protecting group.

22. The method according to any of the preceding claims, wherein reacting a compound of general formula (IIa) or (IIb) with a compound of general formula (III) is carried out in the presence of sterically hindered non-nucleophilic base.

23. The method according to claim 22, wherein the sterically hindered non-nucleophilic base is selected from 2,6-lutidine, 2,4,6-collidine or 2,6-di-tertbutyl-4-methyl pyridine.

24. A steroid modified chacotriose of general formula (Ia) as defined in claim 1 or 11, wherein R^1 represents a tomatidin-3-yl or demissidin-3-yl group.

25. A compound of general formula (VIIIa) as defined in any of claims 4, 10 or 11;
a compound of general formula (VIIIb) as defined in any of claims 7, 10 or 11;
a compound of general formula (VIa) as defined in any of claims 3, 10 or 11;
a compound of general formula (VIb) as defined in any of claims 6, 10 or 11;
a compound of general formula (Va) or (Vb) as defined in any of claims 2, 10 or 11;
a compound of general formula (IVa) or (IVb) as defined in any of claims 1, 10 or 11; or
a compound of general formula (IXb) as defined in any of claims 8, 10 or 11.